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EVALUATION OF SHORT-TERM BIOASSAYS TO PREDICT FUNCTIONAL IMPAIR--ETC(U)

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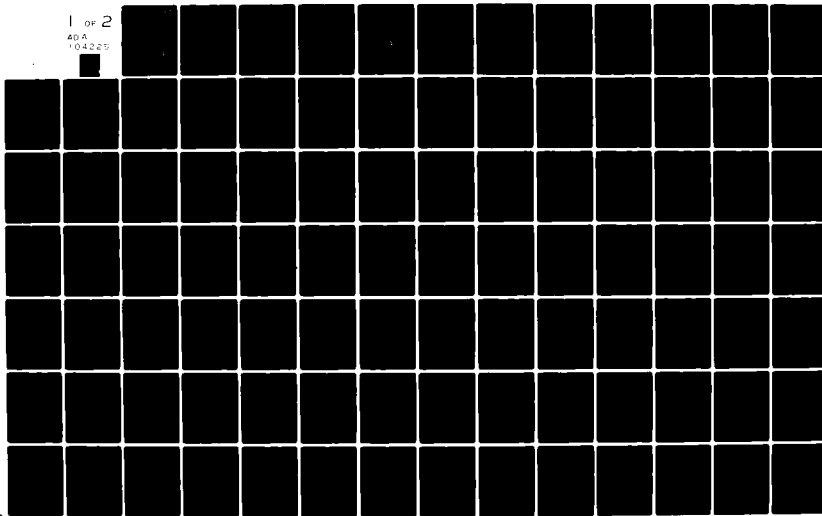
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# EVALUATION OF SHORT-TERM BIOASSAYS TO PREDICT FUNCTIONAL IMPAIRMENT

## Development of Neurobehavioral Bioassays in Laboratory Animals

### Directory of Institutions/Individuals Final Report

(10) Purna Greenaway, James Konz

11 Oct 1980

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McLean, Virginia 22102

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Fort Detrick, Maryland 21701

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bio med corp

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This directory catalogues the organizations currently engaged in neurobehavioral bioassay utilization or development and provides information concerning specific measurements performed, test systems employed and compounds tested for the U.S. Army Medical Bioengineering Research and Development Laboratory.		

## EXECUTIVE SUMMARY

The MITRE Corporation, Metrek Division, is currently assisting the United States Army Medical Bioengineering Research and Development Laboratory (USAMBRDL) in the development of a hierarchical short-term testing scheme for screening substances for functional or morphological impairment in animal test systems. Effects in several organ systems are being considered.

As part of this effort, Metrek has been requested to prepare a directory of organizations and individuals presently involved in development and/or utilization of tests applicable to toxicity screening in the organ systems. The directory of organizations and individuals involved in neurobehavioral testing has been completed and is presented in the following pages.

There are entries in this directory for each organization currently involved in neurobehavioral bioassay use or development. For each entry at least one individual's name appears under the organization name and address at the top of the page. These are the people who, during the process of directory compilation, described either their activities or the activities of their group regarding neurobehavioral testing, and thereby provided the information presented in the entry. The information provided includes the specific tests performed (e.g., sensory, motor, arousal deficits), the test systems utilized (e.g., cats, dogs), and the substances (e.g., heavy metals, pesticides) administered to elicit neurobehavioral response.

In order to facilitate use and the processes of amending and adding to the directory, it has been arranged in alphabetical order by organization.

The objective of this directory is to provide a readily usable guide to that segment of the scientific community currently active in neurobehavioral testing in small animals. Because research associate and graduate student positions are often temporary in nature, a deliberate attempt was made to exclude these individuals from the directory. Their efforts, however, are likely to be represented by activities associated with their organization, as in most cases these individuals are conducting research under the auspices of someone more senior and more permanently allied with the organization, who was included in the directory. In addition, there are individuals who were active in neurobehavioral function testing at one time but are no longer; these have been omitted from the directory also.

Some of the entries in this directory may be less detailed, and less specific in the detail that is presented, than others. In addition, the information presented for an organization may not be reflective of all the neurobehavioral efforts ongoing at that organization. This is due largely to the reluctance of some individuals contacted to communicate the information and, in small part, to an inability to contact a few individuals at the time this directory was being compiled.

# FOREWORD

This Directory was compiled by MITRE staff by means of a survey of the recent literature, and by discussions with leaders in the field and other personal contacts. We are grateful to all those who responded so patiently to our questions regarding their activities. All of the "contact persons" were given an opportunity to review the information relating to their organization. We recognize there may be inadvertent omissions for which we offer our sincere apologies.

Citations of organizations and trade names in this report do not constitute an official Department of the Army endorsement or approval of the products or services of these organizations.

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**DIRECTORY OF ORGANIZATIONS CURRENTLY INVOLVED IN  
UTILIZATION OR DEVELOPMENT OF NEUROBEHAVIORAL  
TESTS IN LABORATORY ANIMALS**



DIRECTORY OF ORGANIZATIONS CURRENTLY INVOLVED IN  
UTILIZATION OR DEVELOPMENT OF NEUROBEHAVIORAL  
TESTS IN LABORATORY ANIMALS

ORGANIZATION:

ALBERT EINSTEIN COLLEGE OF MEDICINE  
INSTITUTE OF NEUROTOXICOLOGY  
BRONX, NEW YORK 10461

D. CROW, ADMINISTRATOR (212) 430-2000, 430-2519

TESTS PERFORMED:

INDUSTRIAL WORK IS CONFIDENTIAL

TESTS ON MONKEYS ARE MAINLY BEHAVIORAL AND NEUROPHYSIOLOGICAL;  
TESTS ON OTHER ANIMALS ARE MAINLY MORPHOLOGICAL

TEST SYSTEMS UTILIZED:

RATS, CATS, MONKEYS, CHICKENS

COMPOUNDS TESTED:

ACRYLAMIDE; ARSENIC; ADRIAMYCIN; AETT\* (FRAGRANCE COMPOUND);  
n-HEXANE; n-BUTYL METHYL KETONE

REMARKS:

H. SCHAUMBURG and M. SABRI ARE ALSO INVOLVED IN NEURO-  
TOXICOLOGICAL TESTING AT THIS ORGANIZATION.

---

\* ACETYLETHYL TETRAMETHYLTETRALIN

ORGANIZATION:

ALBERT EINSTEIN COLLEGE OF MEDICINE  
BRONX, NEW YORK 10461

M. SABRI (212) 430-3359

TESTS PERFORMED:

BIOCHEMICAL TESTS: TESTS FOR ENZYMES AND PROTEINS  
MORPHOLOGICAL TESTING  
BEHAVIORAL TESTS: CLINICAL SYMPTOMS OF NEUROPATHY  
PHYSIOLOGICAL TESTS: ELECTROPHYSIOLOGICAL  
NEUROPATHOLOGICAL TESTS

TEST SYSTEMS UTILIZED:

IN VITRO: RATS

COMPOUNDS TESTED:

ACRYLAMIDE; 2,5-HEXANEDIONE AND CARBON DISULFIDE

REMARKS:

P. SPENCER AND H. SCHAUMBURG ARE ALSO INVOLVED IN  
NEUROTOXICOLOGY TESTING AT THIS ORGANIZATION.

ORGANIZATION:

BATTELLE COLUMBUS LABORATORIES  
COLUMBUS, OHIO 43201

P. KURTZ (614) 424-4078, ext. 4078

TESTS PERFORMED:

SENSORY TESTS:

NEGATIVE GEOTAXIS  
TAIL FLICK

MOTOR TESTS:

ROTAROD  
SPONTANEOUS MOTOR ACTIVITY  
GRIP STRENGTH (FORE- AND HIND-LIMB)  
TREMOR (SUBJECTIVE)

COGNITIVE FUNCTIONS:

DISCRIMINATED ESCAPE TASK (M-MAZE - SHOCK AND WATER ESCAPE)  
SHOCK AVOIDANCE

AROUSAL DEFICITS: STARTLE RESPONSE

PHYSIOLOGICAL TESTS:

BODY WEIGHT  
RECTAL TEMPERATURE  
FOOD/WATER CONSUMPTION

OTHER TESTS:

CLINICAL CHEMISTRY, HEMATOLOGY  
GROSS AND HISTOLOGIC PATHOLOGY  
METABOLISM, PHARMACOKINETICS  
IMMUNOLOGIC FUNCTION

TEST SYSTEMS UTILIZED:

RATS, MICE (ADULT AND DEVELOPING)

COMPOUNDS TESTED:

INFORMATION IS PROPRIETARY - INDUSTRIAL AND ENVIRONMENTAL  
CHEMICALS AND DRUGS.

ORGANIZATION:

BATTELLE-PACIFIC NORTHWEST LABORATORY  
DEVELOPMENTAL TOXICOLOGY  
BATTELLE BOULEVARD  
RICHLAND, WASHINGTON 99352

M. SIKOV (509) 942-3251

TESTS PERFORMED:

MOTOR TESTS:

SPONTANEOUS MOTOR ACTIVITY (OPEN FIELD, SURFACE RIGHTING)  
GRIP STRENGTH  
SWIMMING

AROUSAL DEFICITS: STARTLE RESPONSE

COGNITIVE FUNCTIONS: CONDITIONED AVOIDANCE RESPONSE (SHUTTLE  
BOX)

PHYSIOLOGICAL CONSUMMATORY TESTS

TEST SYSTEMS UTILIZED:

RATS, MICE, SWINE

COMPOUNDS TESTED:

PHYSICAL AGENTS - IONIZING RADIATION, PCB\*, SYNFUEL MATERIALS

REMARKS:

R. H. LOVELY, F. D. ANDREW AND R. JAFFE ARE ALSO INVOLVED IN  
NEUROTOXICOLOGY TESTING AT THIS ORGANIZATION.

---

\* POLYCHLORINATED BIPHENYLS

ORGANIZATION:

BOSTON UNIVERSITY  
SCHOOL OF MEDICINE  
BOSTON, MASSACHUSETTS 02118

C. KORNETSKY (617) 247-6212

TESTS PERFORMED:

SENSORY TESTS:

PAIN (HOT-PLATE)  
REFLEX TESTING

MOTOR TESTS:

SPONTANEOUS MOTOR ACTIVITY (OPEN FIELD)  
ROTAROD

AROUSAL DEFICITS: STARTLE RESPONSE

COGNITIVE FUNCTIONS:

PASSIVE AVOIDANCE  
ESCAPE BEHAVIOR (OPERANT)

PHYSIOLOGICAL:

BODY WEIGHT  
GROWTH

NEUROLOGICAL TESTS: BRAIN STIMULATION (SELF-STIMULATION)

TEST SYSTEMS UTILIZED:

RATS, MICE

COMPOUNDS TESTED:

NEUROLEPTICS, OPIATES, CNS STIMULANTS, PHENCYCLIDINE NARCOTICS  
PCB'S\*

REMARKS

G. FRIEDLER AND H. ROSETTE ARE ALSO INVOLVED IN NEUROTOXICOLOGY  
TESTING AT THIS ORGANIZATION.

---

\* POLYCHLORINATED BIPHENYLS

ORGANIZATION:

BRIGHAM YOUNG UNIVERSITY  
ZOOLOGY DEPARTMENT  
PROVO, UTAH 84601

S. BRADSHAW (801) 378-3677

TESTS PERFORMED:

MOTOR TESTS: SPONTANEOUS MOTOR ACTIVITY (JIGGLE CAGE, OPEN  
FIELD)  
COGNITIVE TESTS: ESCAPE (SWIMMING)

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

CADMIUM, LEAD, DES \*

---

\* DIETHYLSTILBESTEROL

ORGANIZATION:

CHILDREN'S HOSPITAL RESEARCH FOUNDATION  
PSYCHOTERATOLOGY LABORATORY  
INSTITUTE FOR DEVELOPMENTAL RESEARCH  
CINCINNATI, OHIO 45229

C. VORHEES (513) 559-4451

TESTS PERFORMED:

SENSORY TESTS:

NEGATIVE GEOTAXIC (INCLINED PLANE)  
SURFACE RIGHTING  
OLFACTORY ORIENTATION  
PAIN (TAIL FLICK)  
SWIMMING DEVELOPMENT  
CLIFF AVOIDANCE  
STARTLE RESPONSE (AUDITORY)

MOTOR TESTS:

SPONTANEOUS MOTOR ACTIVITY (RUNNING WHEELS, OPEN FIELD,  
RESIDENTIAL ACTIVITY MAZE)  
ROTAROD  
FOOD GRASPING  
POLE WALKING  
NON-NUTRITIVE SUCKING  
GRASP STRENGTH

AROUSAL DEFICITS: EMERGENCE

COGNITIVE FUNCTIONS:

AVOIDANCE (PASSIVE AND WHEEL TURN ACTIVE; AUDITORY OR  
VISUAL CUES)  
DISCRIMINATED AVOIDANCE (Y-MAZE)  
WATER MAZE (M-MAZE AND BIEL COMPLEX MAZE)  
PROBLEM SOLVING STRATEGIES (RADIAL MAZE)  
SPONTANEOUS ALTERNATION

PHYSIOLOGICAL TESTS:

BODY WEIGHT  
FOOD CONSUMPTION  
REGIONAL BRAIN WEIGHT  
NEUROHISTOLOGY (BRAIN)  
TERATOLOGY  
NEUROTRANSMITTERS (BRAIN)

TEST SYSTEMS UTILIZED:

RATS AND MONKEYS



CHILDREN'S HOSPITAL RESEARCH FOUNDATION (CONCLUDED)

COMPOUNDS TESTED:

- 1) FOOD ADDITIVES - MSG<sup>\*</sup>, CARRAGEENAN, ASPARTAME, BHTU<sup>\*\*</sup>, BHA<sup>\*\*\*</sup>, RED DYE 3 & 40, BROMINATED VEGETABLE OIL, TBHQ<sup>\*\*\*\*</sup>, PHENYLALANINE, SODIUM NITRITE, VITAMIN A, METHYL SALICYLATE, POTASSIUM IODIDE, ORGANIC TIN (TRIBUTYL-)
- 2) DRUGS - VALIUM, DARVON, FENFLURAMINE, COMPAZINE, NALOXONE, HYDROXYUREA, ASPIRIN, 5-AZACYTADINE, ETHANOL, ACETAZOLAMIDE, PHENOBARBITAL, DILANTAN, TRIMETHADIONE

REMARKS:

THE FOUNDATION WILL SOON USE PRIMATES AND STUDY ANTICONVULSIVES.

---

\* MONOSODIUM GLUTAMATE

\*\* BUTYLATED HYDROXYTOLUENE

\*\*\* BUTYLATED HYDROXYANISOLE

\*\*\*\* TERTIARY BUTYL HYDROQUINONE

ORGANIZATION:

CORNELL MEDICAL SCHOOL  
DEPARTMENT OF PHARMACOLOGY  
NEW YORK, NEW YORK 10021

T. BAKER (212) 472-5966

TESTS PERFORMED:

MOTOR TESTS:

SPONTANEOUS MOTOR ACTIVITY  
INCLINE CLIMBING  
GAIT  
HINDLIMB REFLEX  
TIGHTENING REFLEX  
MUSCLE TONE  
CLONIC CONVULSIONS

PHYSIOLOGICAL TESTS:

PUPIL SIZE  
PILOERECTION  
ADVENTITIOUS MOVEMENT

NEUROLOGICAL TEST: MOTOR SPINDLE REFLEX (DYNAMIC AND STATIC  
RESPONSE)

TEST SYSTEMS UTILIZED:

CAT

COMPOUNDS TESTED:

ORGANIC PHOSPHATES (ESPECIALLY DFP<sup>\*</sup>); ACRYLAMIDE

REMARKS:

THE CAT WAS CHOSEN BECAUSE THE CAT'S MOTOR SYSTEM IS VERY EFFICIENT; THEREFORE MOTOR FUNCTION PERFORMANCE IS EASILY EVALUATED.

---

\* DIISOPROPYL PHOSPHOROFUORIDATE

ORGANIZATION:

DUKE UNIVERSITY MEDICAL CENTER  
DURHAM, NORTH CAROLINA 27710

M. B. ABOU-DONIA (919) 684-2221

TESTS PERFORMED:

SENSORY TESTS: PAIN  
MOTOR TESTS:  
GAIT  
BALANCE MAINTENANCE

TEST SYSTEMS UTILIZED:

RATS (n-HEXANE), CHICKENS, CATS (ORGANOPHOSPHOROUS ESTERS)

COMPOUNDS TESTED:

ORGANIC SOLVENTS: HEXANE; METHYL BUTYL KETONE; 2,5-HEXANEDIONE;  
2,5-HEXANEDIOL .

ORGANOPHOSPHORUS ESTERS:

DEF	S,S,S-TRI-n-BUTYL PHOSPHOROTRITHIOATE
DIFP	DIISOPROPYL PHOSPHOROFUORIDATE
DICHLORVOS	2,2-DICHLOROETHENYL DIMETHYL PHOSPHATE
EPN	O-ETHYL O-4-NITROPHENYL PHENYLPHOSPHONOTHIOATE
LEPTOPHOS	O-4-BROMO-2,5-DICHLOROPHENYL O-ETHYL PHENYLPHOS- PHONOTHIOATE
MERPHOS	S,S,S-TRI-n-BUTYL PHOSPHOROTRITHIOATE
MIPAFIX	N,N'-DIISOPROPYLPHOSPHORODIAMIDIC FLUORIDE
PARATHION	O,O-DIETHYL O-4-NITROPHENYL PHOSPHATE
TOTP	TRI-o-TOLYL PHOSPHATE
TRICHLORPHON	2,2,2-TRICHLORO-1-HYDROXYETHYL PHOSPHONATE
CYANOFENPHOS	O-4-CYANOPHENYL O-ETHYL PHENYLPHOSPHONOTHIOATE

DUKE UNIVERSITY MEDICAL CENTER (CONCLUDED)

EPDP                    O-2,4-DICHLOROPHENYL O-ETHYL PHENYLPHOSPHONOTHIOATE

COUMAPHOS            O-3-CHLORO-4-METHYLCOUMARIN-7-YL-O,O-DIETHYL  
                         PHOSPHOROTHIOATE

ORGANIZATION:

EASTMAN KODAK COMPANY  
TOXICOLOGY DIVISION  
ROCHESTER, NEW YORK

J. O'DONOGHUE (716) 458-4048

TESTS PERFORMED:

SENSORY TESTS: OPHTHALMOLOGICAL EXAM  
MOTOR TESTS: REFLEX ACTIVITY  
PHYSIOLOGICAL TESTS: ELECTROMYOGRAPHY

TEST SYSTEMS UTILIZED:

RATS, DOGS, CATS

COMPOUNDS TESTED:

KETONES AND CHLORINATED SOLVENTS

REMARKS:

D. TOPPING AND G. D. DIVINCENZO ARE ALSO INVOLVED IN NEUROTOXICOLOGY TESTING AT THIS ORGANIZATION.

ORGANIZATION:

ELI LILLY AND COMPANY  
LILLY RESEARCH LABORATORIES  
TOXICOLOGY DIVISION  
GREENFIELD, INDIANA 46285

D. G. HOFFMAN (317) 462-8200

TESTS PERFORMED:

SENSORY TESTS: EXPLORATORY BEHAVIOR (HOLE-BOARD TEST)

MOTOR TESTS:

SPONTANEOUS MOTOR ACTIVITY (OPEN-FIELD)

ROTAROD

AROUSAL DEFICITS: STARTLE RESPONSE (AUDITORY)

PHYSIOLOGICAL TESTS:

BODY WEIGHT

FOOD CONSUMPTION

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

INFORMATION IS PROPRIETARY

ORGANIZATION:

EXXON CORPORATION  
MEDICAL DEPARTMENT  
P.O. BOX 45  
LINDEN, NEW JERSEY 07036

S. LEWIS (201) 474-0100

TESTS PERFORMED:

NEUROLOGICAL TESTS: AXONAL TRANSPORT  
NEUROPHYSIOLOGICAL TESTS: EFFECTS ON NEUROMUSCULAR FUNCTION (IN  
VITRO TISSUE CULTURE)  
HISTOPATHOLOGICAL TESTS: PURSUING GLYCOLYSIS INHIBITION BY  
NEUROTOXIC AGENTS

TEST SYSTEMS UTILIZED:

RODENTS, DOGS

COMPOUNDS TESTED:

FUELS: PETROLEUM PRODUCTS, BUNKER AND MARINE FUELS, MARINE  
DIESELS, PETROLEUM LUBRICANTS, GREASES, COAL LIQUEFACTION AND  
GASIFICATION PRODUCTS; ORGANIC SOLVENTS; RUBBERS; PLASTICS;  
FERTILIZERS

REMARKS:

DR. J. EAGEN, CHEMICAL PRODUCTS MEDICAL RESEARCH, IS ALSO  
INVOLVED IN NEUROTOXICOLOGICAL TESTING AT THIS ORGANIZATION.

EXXON IS INVOLVED WITH AN INDUSTRY-WIDE NEUROTOXICITY TESTING  
PROGRAM OF SOLVENTS CONDUCTED BY THE AMERICAN PETROLEUM  
INSTITUTE.

ORGANIZATION:

HARVARD UNIVERSITY  
DEPARTMENT OF PSYCHIATRY  
BOSTON, MASSACHUSETTS 02115

P. B. DEWS (617) 732-1680

TESTS PERFORMED:

FIXED INTERVAL OPERANT BEHAVIOR

TEST SYSTEMS UTILIZED:

MICE

COMPOUNDS TESTED:

ORGANIC SOLVENTS



ORGANIZATION:

HAZLETON LABORATORIES, INC.  
DIVISION OF TOXICOLOGY  
VIENNA, VIRGINIA 22180

A. HOBERMAN (703) 893-5400

TESTS PERFORMED:

MOTOR TESTS: SPONTANEOUS MOTOR ACTIVITY (OPEN FIELD)  
COGNITIVE FUNCTIONS: WATER MAZE

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

INFORMATION IS PROPRIETARY

ORGANIZATION:

HOFFMAN-LAROCHE, INC.  
TERATOLOGY DEPARTMENT  
NUTLEY, NEW JERSEY 07110

R. M. HOAR (201) 235-4528

REMARKS:

PROCEDURES FOR POST-NATAL EVALUATION AND VALIDATION ARE BEING  
DEVELOPED.

ORGANIZATION:

INDIANA UNIVERSITY  
DEPARTMENT OF PSYCHOLOGY  
BLOOMINGTON, INDIANA 47401

G. A. HEISE (812) 337-1330

TEST SYSTEMS UTILIZED:

RATS

REMARKS:

THIS ORGANIZATION WILL DEVELOP TESTS USING OPERANT CONDITIONING  
(MEMORY, COGNITIVE FUNCTIONS).

ORGANIZATION:

INTERNATIONAL RESEARCH AND DEVELOPMENTAL CORPORATION  
MATTAWAN, MICHIGAN 49071

D. RODWELL (616) 668-3336

TESTS PERFORMED:

SENSORY TESTS:

AUDITORY LOCALIZATION

VISUAL LOCALIZATION

MOTOR TESTS:

SPONTANEOUS MOTOR ACTIVITY (SURFACE RIGHTING, ACTIVITY CAGE)

ROTAROD

COGNITIVE FUNCTIONS: CLIFF AVOIDANCE

PHYSIOLOGICAL TESTS: BODY WEIGHT

TEST SYSTEMS UTILIZED:

RATS, MICE

COMPOUNDS TESTED:

INFORMATION IS PROPRIETARY

ORGANIZATION:

IOWA STATE UNIVERSITY  
BEHAVIORAL TOXICOLOGY LABORATORY  
AMES, IOWA 50010

W. CUNNINGHAM (515) 294-8626

TESTS PERFORMED:

SENSORY TESTS:

VISUAL DISCRIMINATION  
AUDITORY DISCRIMINATION

COGNITIVE FUNCTIONS:

COMPUTERIZED PATTERN RECOGNITION  
SUCCESSIVE DISCRIMINATION REVERSAL TASKS

TEST SYSTEMS UTILIZED:

MONKEYS

COMPOUNDS TESTED:

CURRENTLY IN USE: LEAD NITRATE, METHYL MERCURY CHLORIDE,  
THALLIUM CHLORIDE  
COMPOUNDS USED IN THE PAST: PESTICIDES, LEAD, LEAD ACETATE

REMARKS:

THE COMPUTERIZED TEST IS BELIEVED TO BE THE SHORTEST TEST AVAILABLE TO DETERMINE DEFICITS IN COGNITIVE FUNCTIONS; IT REQUIRES NO TRAINING AND CAN BE ADAPTED TO THE RAT.

PAST WORK WITH RATS AND SHEEP USED SUCCESSIVE DISCRIMINATION REVERSAL, AUDITORY VIGILANCE, AUDITORY DETECTION, SHUTTLE BOX, TWO CHOICE DISCRIMINATION, CONDITIONED AVOIDANCE, MAZE AND OPEN FIELD.

ELECTROPHYSIOLOGIC TESTS USED INCLUDED EEG AND DEPTH ELECTRODE RECORDING.

SENSORY/MOTOR TESTS HAVE INCLUDED VISUAL CLIFF AND REFLEX DEVELOPMENT.

ORGANIZATION:

JEFFERSON PROFESSIONAL SERVICES  
13924 RIVERCREST DRIVE  
LITTLE ROCK, ARKANSAS 72212

J. SPYKER-CRANMER (501) 661-5100

TESTS PERFORMED:

SENSORY TESTS:

PAIN  
AUDITORY STIMULUS  
VISUAL ORIENTATION

MOTOR TESTS:

SPONTANEOUS MOTOR ACTIVITY (OPEN FIELD, ULTRA SOUND,  
INFRARED)

ROTAROD

TREMOR

AROUSAL DEFICIT: STARTLE RESPONSE

COGNITIVE FUNCTIONS:

PASSIVE AVOIDANCE

Y-MAZE

ESCAPE

COMPOUNDS TESTED:

HYDROCARBONS, PESTICIDES, HEAVY METALS

REMARKS:

D.L. AVERY, K. BAETCKE, M. CRANMER, C. FRITH, T. GAINES,  
B. HIGHMAN, S. IVY, S. LOUIE, AND C. SCOTT ARE ALSO INVOLVED  
IN NEUROTOXICITY TESTING AT THIS ORGANIZATION.

ORGANIZATION:

JOHNS HOPKINS UNIVERSITY  
SCHOOL OF HYGIENE AND PUBLIC HEALTH  
DEPARTMENT OF ENVIRONMENTAL HEALTH SCIENCE  
BALTIMORE, MARYLAND 21205

L. FECHTER (301) 955-3029

TESTS PERFORMED:

COGNITIVE FUNCTIONS: CONDITIONED AVOIDANCE (SHUTTLE BOX)  
MOTOR TESTS: ACTIVITY TEST (OPEN FIELD)  
AROUSAL DEFICITS: AUDITORY STARTLE RESPONSE

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

CARBON MONOXIDE, MANGANESE, LEAD

REMARKS:

Z. ANNAU IS ALSO INVOLVED IN NEUROTOXICOLOGY TESTING AT THIS ORGANIZATION.

ORGANIZATION:

JOHNS HOPKINS HOSPITAL  
DEPARTMENT OF NEUROLOGY  
BALTIMORE, MARYLAND 21205

J. GRIFFIN (301) 955-6435

TESTS PERFORMED:

NEUROPATHOLOGY: PERIPHERAL NERVE DISORDERS (e.g., AXONAL  
TRANSPORT)

TEST SYSTEMS UTILIZED:

RATS, DOGS

COMPOUNDS TESTED:

PROPIONITRILES; RADIATION SENSITIZERS (e.g., MISONIDAZOLE);  
HEXACARBONS; ACRYLAMIDE; CIS-PLATINUM; VACOR

REMARKS:

D. PRICE, E. STANLEY AND A. PESTRONK ARE ALSO INVOLVED IN  
NEUROTOXICOLOGY TESTING AT THIS ORGANIZATION.



ORGANIZATION:

JOHNS HOPKINS UNIVERSITY  
SCHOOL OF HYGIENE AND PUBLIC HEALTH  
DEPARTMENT OF EPIDEMIOLOGY  
BALTIMORE, MARYLAND 21205

A. A. MONJAN (301) 955-3289

TESTS PERFORMED:

COGNITIVE FUNCTIONS:  
  AVOIDANCE (PASSIVE AND ACTIVE)  
  ESCAPE (SHUTTLE BOX)  
  OPERANT CONDITIONING  
MOTOR TESTS:  
  SPONTANEOUS MOTOR ACTIVITY  
  OPEN FIELD  
AROUSAL DEFICITS: STARTLE RESPONSE  
PHYSIOLOGICAL TESTS

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

ALCOHOL, LEAD, VIRUSES, TERATOGENS

ORGANIZATION:

LEDERLE LABORATORIES  
PEARL RIVER, NEW YORK 10962

F. CANN (914) 735-5000

TESTS PERFORMED:

SENSORY TESTS: PRESENCE OF NORMAL FUNCTION  
MOTOR TESTS: REFLEX TESTING  
NEUROLOGICAL TESTS: EEG  
MORPHOLOGICAL TESTS: ELECTRON-MICROSCOPY

TEST SYSTEMS UTILIZED:

RODENTS AND OTHER MAMMALIAN SPECIES

COMPOUNDS TESTED

PROPRIETARY INFORMATION

ORGANIZATION:

LITTON BIONETICS, INC.  
FALLS CHURCH, VIRGINIA

J. SEKERKE (703) 532-1085

TESTS PERFORMED:

OPEN FIELD

TEST SYSTEMS UTILIZED:

RATS OR MICE

COMPOUNDS TESTED:

VARIOUS (PRIVILEGED INFORMATION)

REMARKS:

THE ORGANIZATION HAS THE CAPABILITY OF STUDYING COGNITIVE  
FUNCTIONS USING AVOIDANCE TESTS.

ORGANIZATION:

McNEIL LABORATORIES, INC.  
DRUG SAFETY EVALUATION  
PORT WASHINGTON, PENNSYLVANIA

R. STEELMAN (215) 836-4500

TESTS PERFORMED:

SENSORY TESTS: HEARING  
TESTING BY STIMULATION OR DEPRESSION

TEST SYSTEMS UTILIZED:

RATS, MICE, DOGS, PRIMATES, RABBITS, GUINEA PIGS, PIGS, CATS

COMPOUNDS TESTED:

THERAPEUTIC DRUGS, e.g., HALOPERIDOL; ZOMEPIRAC

REMARKS:

J. GARDOCKI, DEPARTMENT OF PHARMACOLOGY, IS ALSO INVOLVED IN  
NEUROTOXICOLOGY TESTING AT THIS ORGANIZATION.

ORGANIZATION:

MEAD JOHNSON RESEARCH CENTER  
MEAD-JOHNSON PHARMACEUTICAL DIVISION  
DEPARTMENT OF BIOLOGIC RESEARCH  
EVANSVILLE, INDIANA 47721

L. RIBLET (812) 838-5561, ext. 200

TESTS PERFORMED:

SENSORY TESTS: PAIN (TAIL FLICK, HOTPLATE)  
MOTOR TESTS:  
    SPONTANEOUS MOTOR ACTIVITY (ACTIVITY CAGE)  
    ROTAROD  
COGNITIVE FUNCTIONS: CONDITIONED AVOIDANCE RESPONSE (SHUTTLE  
    BOX)  
PHYSIOLOGICAL AND CONSUMMATORY TESTS

TEST SYSTEMS UTILIZED:

RATS, DOGS, MONKEYS, MICE

COMPOUNDS TESTED:

BARBITURATES, ALCOHOL

REMARKS:

H. STANTON IS ALSO INVOLVED IN NEUROTOXICOLOGY TESTING AT THIS  
ORGANIZATION.

ORGANIZATION:

MEDICAL COLLEGE OF VIRGINIA  
DEPARTMENT OF ANATOMY  
MCV STATION  
RICHMIND, VIRGINIA 23298

R. L. JORDAN (804) 786-9000

TESTS PERFORMED:

MOTOR TESTS: SPONTANEOUS MOTOR ACTIVITY (OPEN FIELD)

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

PCP<sup>\*</sup>, TETRAETHYL TIN, ACRYLAMIDE

REMARKS:

R. BALSTAR IS ALSO INVOLVED IN NEUROTOXICOLOGY TESTING AT THIS ORGANIZATION.

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<sup>\*</sup>PHENCYCLIDINE

ORGANIZATION:

MEDICAL UNIVERSITY OF SOUTH CAROLINA  
DEPARTMENT OF BIOCHEMISTRY  
CHARLESTON, SOUTH CAROLINA 29403

L. MIDDAUGH (803) 792-2331

TESTS PERFORMED:

SENSORY TESTS: LIGHT-DARK DISCRIMINATION

MOTOR TESTS:

SPONTANEOUS MOTOR ACTIVITY (OPEN FIELD, PHOTOCCELL, CONTACT  
PLATE)

AROUSAL TESTS: STARTLE RESPONSE

COGNITIVE FUNCTIONS:

OPERANT CONDITIONING

AVOIDANCE (SHUTTLE BOX)

TEST SYSTEMS UTILIZED:

MICE

COMPOUNDS TESTED:

METHADONE, PHENOBARBITAL, AMPHETAMINE, ALCOHOL

ORGANIZATION:

MERCK, SHARPE AND DOHME  
DEPARTMENT OF SAFETY ASSESSMENT  
WEST POINT, PENNSYLVANIA 19486

R. ROBERTSON (215) 699-5311, ext. 5530

TESTS PERFORMED:

SENSORY TESTS: NEGATIVE GEOTAXIS (PIVOTING)  
MOTOR TESTS:  
    SPONTANEOUS MOTOR ACTIVITY (RIGHTING REFLEX, OPEN FIELD)  
    CONFINED MOTOR ACTIVITY  
    ROTAROD  
AROUSAL DEFICIT: STARTLE REFLEX (AUDITORY)  
COGNITIVE FUNCTIONS:  
    ESCAPE  
    PASSIVE AVOIDANCE (STEP THROUGH)  
    WATER T-MAZE  
PHYSIOLOGICAL TESTS  
SWIMMING (ONTOGENIC IMPAIRMENT)

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

PHARMACEUTICAL (REFERENCE AND NEW) PRODUCTS

REMARKS:

D. MINSKER IS ALSO INVOLVED IN NEUROTOXICOLOGY TESTING AT THIS ORGANIZATION.



ORGANIZATION:

MISSISSIPPI STATE UNIVERSITY  
DEPARTMENT OF ENTOMOLOGY  
MISSISSIPPI STATE, MISSISSIPPI 39762

D. SHANKLAND (601) 325-4541

TESTS PERFORMED:

NEUROPHYSIOLOGICAL TESTS:

SYNAPTIC FUNCTION

ELECTROPHYSIOLOGICAL RESPONSE

BIOCHEMICAL TESTS:

ACTION ON ISOLATED SYNAPTOSOMES

TRANSMITTER RELEASE ESPECIALLY WITH ACETYL-CHOLINE

TEST SYSTEMS UTILIZED:

FISH

COMPOUNDS TESTED:

BICYCLODIENES; MIREX; LINDANE

REMARKS:

J. CHAMBERS AND J. YARBOROUGH, DEPARTMENT OF BIOLOGY, ARE ALSO INVOLVED IN NEUROTOXICOLOGY TESTING AT THIS ORGANIZATION.

ORGANIZATION:

NATIONAL INSTITUTE OF ENVIRONMENTAL  
HEALTH SCIENCES  
LABORATORY OF BEHAVIORAL AND  
NEUROLOGICAL TOXICOLOGY  
RESEARCH TRIANGLE PARK, NORTH CAROLINA 27709

H. TILSON (919) 541-4320

TESTS PERFORMED:

SENSORY TESTS:

PAIN (TAIL FLICK)  
NEGATIVE GEOTAXIS

MOTOR TESTS:

SPONTANEOUS MOTOR ACTIVITY (ACTIVITY CHAMBER)  
GRIP STRENGTH (FORE- AND HIND-LIMB)

AROUSAL DEFICITS:

STARTLE RESPONSE  
EMERGENCE

COGNITIVE FUNCTIONS: CONDITIONED AVOIDANCE (2-WAY SHUTTLE BOX)

PHYSIOLOGICAL TESTS:

BODY WEIGHT  
RECTAL TEMPERATURE

CONSUMMATORY TESTS

TEST SYSTEMS UTILIZED:

RATS, MICE (ADULT AND DEVELOPING)

COMPOUNDS TESTED:

KNOWN NEUROTOXINS, HEAVY METALS, PESTICIDES, HYDROGENATED  
HYDROCARBONS, VOLATILE SOLVENTS

REMARKS:

C. MITCHELL, P. CABE AND R. SQUIBB ARE INVOLVED IN BEHAVIORAL  
STUDIES AT THIS ORGANIZATION.

S. BONDIE, J. HONG, L. APHOUSE AND B. WILSON ARE INVOLVED IN  
NEUROCHEMICAL STUDIES AT THIS ORGANIZATION.

ORGANIZATION:

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH  
BEHAVIORAL AND MOTIVATIONAL FACTORS BRANCH  
BEHAVIORAL STUDIES SECTION  
CINCINNATI, OHIO 45226

K. ANGER (513) 684-8383

TESTS PERFORMED:

SENSORY TESTS:

VISUAL THRESHOLD  
AUDITORY THRESHOLD

MOTOR TESTS:

SPONTANEOUS MOTOR ACTIVITY (OPEN FIELD, ACTIVITY WHEEL)  
TREMOR  
ROTAROD

COGNITIVE FUNCTIONS:

AVOIDANCE  
DISCRIMINATION  
OPERANT CONDITIONING

NEUROLOGICAL TESTS:

EEG  
NERVE CONDUCTION VELOCITY

TEST SYSTEMS UTILIZED:

RATS, MONKEYS, OCCUPATIONALLY EXPOSED HUMANS

COMPOUNDS TESTED:

PERCHLORETHYLENE, 2-ETHOXYETHANOL

REMARKS:

K. NELSON, V. PUTZ, D. CHRISLIP, J. RUSSO, J. V. SETZER AND B.  
L. JOHNSON ARE ALSO INVOLVED IN NEUROTOXICOLOGY TESTING AT THIS  
INSTITUTION.

HUMAN OCCUPATIONAL AND LABORATORY STUDIES HAVE INCLUDED EXPOSURE  
TO LEAD, CARBON DISULFIDE, CARBON MONOXIDE, METHYL KETONE, BUTYL  
KETONE, METHYL BROMIDE, CARBARYL, MMT\*, LITHIUM TOCP\*\*, METHYLENE  
CHLORIDE, METHYL CHLORIDE, METHYL CHLORIDE WITH ETHANOL, CAF-  
FEINE AND VALIUM, TOLUENE AND MEK\*\*\*, SEPARATELY AND IN COMBINA-  
TION.

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\* METHYL-M-TYROSINE

\*\* TRI-O-TOLYL PHOSPHATE

\*\*\* METHYL ETHYL KETONE

ORGANIZATION:

NEW JERSEY MEDICAL SCHOOL  
DEPARTMENT OF PATHOLOGY  
NEWARK, NEW JERSEY

E. S. CHO (201) 456-4145

TESTS PERFORMED:

MORPHOLOGICAL TESTS:  
LIGHT AND ELECTRON MICROSCOPY  
TEASED-NERVE PREPARATION  
ENZYME HISTOCHEMISTRY

TEST SYSTEMS UTILIZED:

CATS, RATS

COMPOUNDS TESTED:

ADRIAMYCIN, QUELAMYCIN, VINCRISTINE AND ACRYLAMIDE

REMARKS:

B. S. JORTNER IS ALSO INVOLVED IN NEUROTOXICOLOGY TESTING AT  
THIS ORGANIZATION.

ORGANIZATION:

NEW JERSEY MEDICAL SCHOOL  
DEPARTMENT OF PHARMACOLOGY  
NEWARK, NEW JERSEY

H. E. LOWNDES (201) 456-5469

TESTS PERFORMED:

CLASSIC NEUROPHYSIOLOGICAL APPROACH:  
CLINICAL NEUROPATHY  
BIOCHEMICAL ALTERATIONS  
MORPHOLOGICAL ALTERATIONS  
SENSORY AND MOTOR FUNCTIONS

TEST SYSTEMS UTILIZED:

RATS, CATS

COMPOUNDS TESTED:

ORGANOPHOSPHATES (DFP<sup>\*</sup> AND PARATHION); ACRYLAMIDES: IMINO  
DIPROPYL NITRILE; VINCRISTINE

REMARKS:

R. D. HOWLAND, DEPARTMENT OF PHARMACOLOGY, E. S. CHO, DEPARTMENT  
OF PATHOLOGY, AND B. S. JORTNER, DEPARTMENT OF PATHOLOGY, ARE  
ALSO INVOLVED WITH NEUROTOXICOLOGY TESTING AT THIS ORGANIZATION.

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<sup>\*</sup> DIISOPROPYL PHOSPHOFLUORIDATE

ORGANIZATION:

NEW YORK STATE DEPARTMENT OF MENTAL HYGIENE  
DEPARTMENT OF BEHAVIORAL PHYSIOLOGY  
NEW YORK, NEW YORK 10032

D. HUTCHINGS (212) 568-4000

TESTS PERFORMED:

ELECTRONIC ACTIVITY MONITOR  
COGNITIVE FUNCTIONS:  
OPERANT CONDITIONING  
DISCRIMINATION

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

VITAMIN A EXCESS, METHADONE

ORGANIZATION:

NEW YORK STATE INSTITUTE FOR RESEARCH IN  
MENTAL RETARDATION  
NEUROTERATOLOGY DEPARTMENT  
STATEN ISLAND, NEW YORK 10314

R. K. HADDAD (212) 698-1122, ext. 750

TESTS PERFORMED:

MOTOR TESTS:

REFLEX DEVELOPMENT  
SPONTANEOUS MOTOR ACTIVITY (OPEN FIELD)  
REARING AND AMBULATION (PHOTO CELLS)

COGNITIVE FUNCTIONS:

MAZE DISCRIMINATION  
OPERANT CONDITIONING  
ESCAPE  
AVOIDANCE  
RETENTION

PHYSIOLOGICAL TESTS

NEUROLOGICAL TESTS:

EEG  
SEIZURE THRESHOLDS  
PKU MODELS

TEST SYSTEMS UTILIZED:

MICE, RATS, RABBITS, HAMSTERS, CATS, MONKEYS, DOGS

COMPOUNDS TESTED:

METHYL AZOXYMETHANOL ACETATE, ETHANOL, ALUMINUM

REMARKS:

A. RABE AND M. HELEE ARE ALSO INVOLVED IN NEUROTOXICOLOGY  
TESTING AT THIS INSTITUTION.

ORGANIZATION:

NEW YORK UNIVERSITY MEDICAL CENTER  
INSTITUTE OF ENVIRONMENTAL MEDICINE  
TUXEDO, NEW YORK 10987

H. L. EVANS (212) 340-7300, EXT. 5263 (NEW YORK CITY)  
(914) 351-4249 (TUXEDO)

TESTS PERFORMED:

SENSORY TESTS: COMPREHENSIVE  
MOTOR TESTS: REFLEX ACTIVITY  
COGNITIVE FUNCTIONS: CONDITIONED BEHAVIOR  
PHYSIOLOGICAL: FOOD INTAKE AND METABOLISM

TEST SYSTEMS UTILIZED:

PRIMATES, RODENTS, FISH, BIRDS

COMPOUNDS TESTED:

ACRYLAMIDE, METALS, PESTICIDES, DRUGS, AIR POLLUTANTS:  
FORMALDEHYDE, ORGANIC SOLVENTS, ASBESTOS, COMBUSTION PRODUCTS

REMARKS:

E.D. PALMES IS ALSO INVOLVED IN NEUROTOXICOLOGY TESTING AT THIS  
ORGANIZATION.



ORGANIZATION:

NORTH CAROLINA STATE UNIVERSITY  
DEPARTMENT OF ZOOLOGY  
RALEIGH, NORTH CAROLINA 27650

G. T. BARTHALMUS (919) 737-2698

TESTS PERFORMED:

SENSORY TESTS: PHOTOTAXIS BEHAVIOR USING 2,4-D \*

MOTOR TESTS: LOCOMOTOR BEHAVIOR

COGNITIVE FUNCTIONS:

OPERANT CONDITIONING

AVOIDANCE (SHUTTLE BOX)

UNSIGNALLED AND SIGNALLED (ON FISH AND QUAIL)

TEST SYSTEMS UTILIZED:

MARINE ORGANISMS; GRASS SHRIMPS; GOLDFISH; JAPANESE QUAIL

COMPOUNDS TESTED:

MERCURY AND 2,4-D

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\* (2,4-DICHLOROPHENOXY) ACETIC ACID

ORGANIZATION:

NORTHEASTERN ILLINOIS UNIVERSITY  
DEPARTMENT OF PSYCHOLOGY  
NEUROPSYCHOLOGY LABORATORY  
CHICAGO, ILLINOIS 60625

W. PIZZI (312) 583-4050, ext. 667

TESTS PERFORMED:

SENSORY TESTS:

EXPLORATORY BEHAVIOR (HOLE-BOARD TEST)  
NEGATIVE GEOTAXIS

MOTOR TESTS:

SPONTANEOUS MOTOR ACTIVITY (OPEN FIELD, ACTIVITY WHEELS,  
ACTIVITY CAGE)  
ROTAROD

COGNITIVE FUNCTIONS:

MAZES  
OPERANT CONDITIONING  
AVOIDANCE (ACTIVE AND PASSIVE)

PHYSIOLOGICAL AND CONSUMMATORY TESTS

NEUROLOGICAL TESTS: EEG

TEST SYSTEMS UTILIZED:

MICE, RATS

COMPOUNDS TESTED:

EXCITOTOXIC AMINO ACIDS - GLUTAMATE, ASPARTATE; AMPHETAMINE,  
VALIUM, LIBRIUM, AGONISTS AND ANTAGONISTS, DYES (FOOD ADDITIVES)

REMARKS:

MIDWEST BEHAVIORAL TOXICOLOGY ASSOCIATION IS BEING FORMED BY:

DR. GENE YOUKILIS  
394 DELTA ROAD  
HIGHLAND PARK, ILLINOIS 60035

ORGANIZATION:

OHIO STATE UNIVERSITY  
COLLEGE OF MEDICINE  
COLUMBUS, OHIO 43210

D. COURI (614) 422-0168

TESTS PERFORMED:

BIOCHEMICAL TESTS  
LOCOMOTOR ACTIVITY

TEST SYSTEMS UTILIZED:

HUMAN TISSUES-IN VIVO; MICE; RATS

COMPOUNDS TESTED:

CARCINOGENS: BENZO-PYRENE; AFLATOTOXIN AND SELINIUM  
COMPOUNDS  
MECHANISM: PCB<sup>\*</sup>; PHENOBARBITOL; SOLVENTS

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<sup>\*</sup>POLYCHLORINATED BIPHENYLS

ORGANIZATION:

PHARMAKON LABORATORIES  
SCRANTON, PENNSYLVANIA 18510

R. MATTHEWS (717) 344-9536

TESTS PERFORMED:

MOTOR TESTS:

SPONTANEOUS MOTOR ACTIVITY (INCLINED SCREEN)  
ROTAROD

AROUSAL DEFICIT: STARTLE RESPONSE

COGNITIVE FUNCTIONS: CONDITIONED AVOIDANCE RESPONSE

NEUROLOGICAL TESTS: EEG

IRVIN RESPONSE

TEST SYSTEMS UTILIZED:

MOUSE, RAT

COMPOUNDS TESTED:

AETT OR ACETYLETHYL TETRAMETHYLTETRALIN (FRAGRANCE);  
2,5-HEXANEDIONE

REMARKS:

R. NAISMITH AND R. PANASCVICH ARE ALSO INVOLVED IN NEUROTOXICOLOGY TESTING AT THIS INSTITUTION; ORGANOPHOSPHATES WILL BE TESTED LATER.

ORGANIZATION:

RESEARCH INSTITUTE ON ALCOHOLISM  
BUFFALO, NEW YORK

E. L. ABEL (716) 887-2550

TESTS PERFORMED:

MOTOR TESTS: ROTAROD

COGNITIVE FUNCTIONS:

PASSIVE AVOIDANCE (STEP-DOWN)

ACTIVE AVOIDANCE (SHUTTLE-BOX)

SPONTANEOUS ALTERNATION (T-MAZE)

WATER MAZE

HABITUATION

PHYSIOLOGICAL TESTS: BODY WEIGHT

BIOCHEMICAL TESTS

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

ALCOHOL

MARIJUANA

ORGANIZATION:

SANDOZ, INC.  
DEPARTMENT OF PRECLINICAL SAFETY ASSESSMENT  
EAST HANOVER, NEW JERSEY 07936

R. BAGDON (201) 386-7518

TESTS PERFORMED:

DIRECT OBSERVATION

TEST SYSTEMS UTILIZED:

RATS, DOGS, MICE, RABBITS

COMPOUNDS TESTED:

PHARMACEUTICALS  
AGRICULTURAL CHEMICALS  
INDUSTRIAL CHEMICALS

REMARKS:

R. J. VAN RYZIN IS ALSO INVOLVED IN NEUROTOXICOLOGY TESTING AT  
THIS ORGANIZATION.

ORGANIZATION:

SCIENCE APPLICATIONS, INC.  
DIVISION OF TOXICOLOGY  
476 PROSPECT STREET, P.O. BOX 1454  
LA JOLLA, CALIFORNIA 92038

S. HARRIS (714) 454-3811

TESTS PERFORMED:

SENSORY TESTS:

AUDITORY AND VISUAL MODIFICATION OF STARTLE REFLEX  
NEGATIVE GEOTAXIS  
RIGHTING  
OLFACTORY DISCRIMINATION  
PAIN SENSITIVITY

MOTOR TESTS:

RESIDENTIAL (FIGURE 8) MAZE ACTIVITY  
PIVOTING  
OPEN FIELD  
RUNNING WHEEL  
ROTAROD

COGNITIVE FUNCTIONS:

OPERANT CONDITIONING  
ACTIVE AND PASSIVE AVOIDANCE  
DISCRIMINATED AVOIDANCE  
WATER MAZE LEARNING

PHYSIOLOGICAL TESTS:

UNRESTRAINED WHOLE ANIMAL RESPIROMETRY  
GROWTH AND PHYSICAL DEVELOPMENT

TEST SYSTEMS UTILIZED:

RAT, MOUSE

COMPOUNDS TESTED:

COMPOUNDS ARE PROPRIETARY INFORMATION OF CLIENTS

ORGANIZATION:

SEARLE LABORATORIES  
DEPARTMENT OF SAFETY ASSESSMENT  
BOX 5110  
SKOKIE, ILLINOIS 60680

W. POOL (312) 982-4982

TESTS PERFORMED:

MOTOR TESTS:

SPONTANEOUS MOTOR ACTIVITY (INCLINED SCREEN, OPEN FIELD)

GAIT

TREMOR

ROTAROD

AROUSAL DEFICIT: STARTLE RESPONSE

PSYCHOLOGICAL TESTS

TEST SYSTEMS UTILIZED:

RATS, DOGS

COMPOUNDS TESTED:

DEVELOPMENTAL DRUGS



ORGANIZATION:

SMITH, KLINE AND FRENCH LABORATORIES  
DEPARTMENT OF TOXICOLOGY  
PHILADELPHIA, PENNSYLVANIA 19101

K. SZABO (215) 854-4000

TEST PERFORMED:

INFORMATION IS PROPRIETARY

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

INFORMATION IS PROPRIETARY

ORGANIZATION:

SOUTHWEST FOUNDATION FOR RESEARCH AND EDUCATION  
P.O. BOX 28147  
SAN ANTONIO, TEXAS 78284

I. GELLER (512) 674-1410

TESTS PERFORMED:

MOTOR TESTS:

SPONTANEOUS MOTOR ACTIVITY (ACTIVITY BOX)  
NEUROMOTOR FUNCTION (FOOT SPREAD TECHNIQUE)

AROUSAL DEFICIT: STARTLE RESPONSE

COGNITIVE FUNCTIONS:

OPERANT CONDITIONING  
PASSIVE AVOIDANCE  
DISCRIMINATION

TEST SYSTEMS UTILIZED:

RATS

REMARKS:

THIS ORGANIZATION IS COMPARING OBSERVATIONAL TESTS WITH OPERANT TESTS.

ORGANIZATION:

SRI INTERNATIONAL  
MENLO PARK, CALIFORNIA 94025

G. PRYOR (415) 326-6200, ext. 3500

TESTS PERFORMED:

SENSORY TESTS:

PAIN (TAIL FLICK)

NEGATIVE GEOTAXIS (ROTATION ORIENTATION)

MOTOR TESTS:

GRIP STRENGTH (FORE- AND HIND-LIMB)

UNDIFFERENTIATED MOTOR ACTIVITY

AROUSAL DEFICITS: STARTLE RESPONSE (AUDITORY, AIR PUFF)

COGNITIVE FUNCTIONS: MULTISENSORY CONDITIONED AVOIDANCE TASK

PHYSIOLOGICAL TESTS: BODY WEIGHT

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

ACRYLAMIDE, TETRAETHYLtin, ARSENIC, KEPONE, METHYL MERCURY, LEAD  
ACETATE, d-AMPHETAMINE, MONOSODIUM SALICYCLATE, TRIETHYL LEAD  
CHLORIDE, HEXANE, ANTINEOPLASTIC AGENTS

ORGANIZATION:

STATE UNIVERSITY OF NEW YORK, ALBANY  
DEPARTMENT OF PSYCHOLOGY  
ALBANY, NEW YORK 12222

E. RILEY (518) 457-8482

TESTS PERFORMED:

MOTOR TESTS:

SPONTANEOUS MOTOR ACTIVITY (OPEN FIELD, NOSE POKE/HEAD  
DIPPING)

AROUSAL DEFICIT: STARTLE RESPONSE

COGNITIVE FUNCTIONS:

REVERSAL LEARNING

OPERANT CONDITIONING

PASSIVE AVOIDANCE (STEP-THROUGH)

T-MAZE

SPONTANEOUS ALTERNATION

PHYSIOLOGICAL TESTS

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

ALCOHOL, METHADONE

ORGANIZATION:

STATE UNIVERSITY OF NEW YORK, BINGHAMTON  
DEPARTMENT OF PSYCHOLOGY AND CENTER FOR  
NEUROBEHAVIORAL SCIENCES  
BINGHAMTON, NEW YORK 13901

L. SPEAR (607) 798-2825

TESTS PERFORMED:

MOTOR TESTS: SPONTANEOUS MOTOR ACTIVITY (OPEN FIELD)  
COGNITIVE FUNCTIONS: AVOIDANCE (ACTIVE AND PASSIVE)  
PHYSIOLOGICAL TESTS

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

STIMULANTS, OPIATES, ANTIPSYCHOTICS, OTHER DRUGS, PEPTIDES

REMARKS:

L. RASTINE IS ALSO INVOLVED IN NEUROTOXICOLOGY TESTING AT THIS  
ORGANIZATION.

ORGANIZATION:

STATE UNIVERSITY OF NEW YORK, BUFFALO  
DEPARTMENT OF PHARMACOLOGY  
BUFFALO, NEW YORK

G. WINTER (716) 831-3649, 831-5122

TESTS PERFORMED:

OPERANT BEHAVIOR: AFFECT OF DRUGS ON OPERANT BEHAVIOR  
GROSS BEHAVIOR: SPONTANEOUS MOTOR ACTIVITY

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

NICOTINE, CAFFIENE AND HALLUCINOGENIC AGENTS: OPIATES AND  
PHENCYCLIDENE, LSD\*, Mescaline

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\* LYSERGIC ACID DIETHYLAMIDE

ORGANIZATION:

STERLING-WINTHROP RESEARCH INSTITUTE  
DEPARTMENT OF TOXICOLOGY  
RENSSELAER, NEW YORK 12144

J. C. BRADFORD (518) 445-8330

TESTS PERFORMED:

MOTOR TESTS:

RIGHTING REFLEX  
GAIT  
STARTLE REFLEX

TEST SYSTEMS UTILIZED:

RATS

ORGANIZATION:

SYRACUSE UNIVERSITY  
BRAIN RESEARCH LABORATORY  
SYRACUSE, NEW YORK 13210

M.J. WAYNER (315) 423-2923

TESTS PERFORMED:

SENSORY TESTS:

PAIN (TAIL FLINCH)

AUDITORY LOCALIZATION

MOTOR TESTS: REFLEX (GRASPING)

AROUSAL DEFICITS: STARTLE RESPONSE

PHYSIOLOGICAL TESTS:

BODY TEMPERATURE

AUTONOMIC SIGNS

ELECTROPHYSIOLOGY (EVOKED POTENTIAL; SINGLE UNIT RECORDING)

EEG

NEUROCHEMICAL TESTS

TEST SYSTEMS UTILIZED:

RATS/MICE, RABBITS

COMPOUNDS TESTED:

ACETYL PYRIDINE, ACRYLAMIDE, TOLUENE, NITROBENZENE, TRIETHYL  
TIN

REMARKS:

F. BARONE IS DEVELOPING A NEUROBEHAVIORAL TEST INVOLVING  
SCHEDULE-INDUCED BEHAVIOR.



ORGANIZATION:

THE PROCTOR AND GAMBLE COMPANY  
HUMAN ENVIRONMENTAL SAFETY DIVISION  
CINCINNATI, OHIO 45239

G. A. NOLAN (513) 977-2438

TESTS PERFORMED:

SENSORY TESTS: PAIN (PINCH TEST)  
MOTOR TESTS: SPONTANEOUS MOTOR ACTIVITY (PHOTOCELL CAGE)  
AROUSAL DEFICIT: STARTLE RESPONSE  
COGNITIVE FUNCTIONS: CLIFF AVOIDANCE

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

HYPERVITAMINOSIS (A)

REMARKS:

THIS ORGANIZATION WILL EXPAND ITS PROGRAM TO INCLUDE MORE TESTS  
AND CHEMICALS.

ORGANIZATION:

THE UPJOHN COMPANY  
DEPARTMENT OF PATHOLOGY AND TOXICOLOGY RESEARCH  
KALAMAZOO, MICHIGAN 49001

J. STUCKHARDT (616) 385-7179

TESTS PERFORMED:

SENSORY TESTS: VISUAL PLACING

MOTOR TESTS:

SWIMMING PERFORMANCE

ROTAROD

SPONTANEOUS MOTOR ACTIVITY (OPEN FIELD, SURFACE RIGHTING,  
PIVOTING)

AROUSAL DEFICITS: STARTLE RESPONSE (AUDITORY)

COGNITIVE FUNCTIONS: M-MAZE (SWIMMING)

PHYSIOLOGICAL TESTS

TEST SYSTEMS UTILIZED:

MICE, RATS

COMPOUNDS TESTED:

METHYL MERCURY; DEVELOPMENTAL DRUGS; OCHRATOXIN #A

REMARKS:

S. POPPE IS ALSO INVOLVED IN NEUROTOXICOLOGY TESTING AT THIS  
ORGANIZATION.

ORGANIZATION:

UNIVERSITY OF ARKANSAS  
SCHOOL OF MEDICAL SCIENCES  
DEPARTMENT OF PHARMACOLOGY  
LITTLE ROCK, ARKANSAS 72201

D.E. MCMILLAN (501) 661-5516

TESTS PERFORMED:

SENSORY TESTS: PAIN, TOUCH, VISUAL, ETC.

MOTOR TESTS: LOCOMOTOR ACTIVITY

COGNITIVE FUNCTIONS: OPERANT CONDITIONING (MEMORY, CHANGE IN  
PERFORMANCE)

MAINLY INVOLVED IN MATCHING BEHAVIORAL EFFECTS OF DRUGS WITH  
BLOOD LEVELS OF DRUGS

TEST SYSTEMS UTILIZED:

RATS, MICE, PIGEONS

COMPOUNDS TESTED:

HEAVY METALS: SOLVENTS, INSECTICIDES, ETC.

PSYCHOACTIVE DRUGS

REMARKS:

G. WENGER IS ALSO INVOLVED IN NEUROTOXICOLOGY TESTING AT THIS  
ORGANIZATION.

ORGANIZATION:

UNIVERSITY OF ARKANSAS MEDICAL CENTER  
DEPARTMENT OF PHARMACOLOGY  
LITTLE ROCK, ARKANSAS 72201

J. SPYKER-CRANMER (501) 661-5100

TESTS PERFORMED:

SENSORY TESTS:

PAIN  
AUDITORY STIMULUS  
VISUAL ORIENTATION

MOTOR TESTS:

SPONTANEOUS MOTOR ACTIVITY (OPEN FIELD, ULTRA SOUND,  
INFRARED)

ROTAROD  
TREMOR

AROUSAL DEFICIT: STARTLE RESPONSE

COGNITIVE FUNCTIONS:

PASSIVE AVOIDANCE  
Y-MAZE  
ESCAPE

COMPOUNDS TESTED:

HYDROCARBONS, PESTICIDES, HEAVY METALS

REMARKS:

D. L. AVERY IS ALSO INVOLVED IN NEUROTOXICOLOGY TESTING AT THIS  
ORGANIZATION.

ORGANIZATION:

UNIVERSITY OF CALIFORNIA  
CALIFORNIA PRIMATE RESEARCH CENTER  
PERINATAL BIOLOGY UNIT  
DAVIS, CALIFORNIA 95616

M. GOLUB (916) 752-2119

TESTS PERFORMED:

MOTOR TESTS:  
REFLEX DEVELOPMENT TESTS  
SEIZURE THRESHOLD  
AROUSAL DEFICIT: STARTLE RESPONSE  
COGNITIVE FUNCTIONS:  
SHOCK-AVOIDANCE CONDITIONING  
RADIAL MAZE  
OPERANT CONDITIONING  
PHYSIOLOGICAL TESTS

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

THC<sup>\*</sup>, CHLORPROMAZINE

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<sup>\*</sup>THIOCARBANIDINE

ORGANIZATION:

UNIVERSITY OF CHICAGO  
DEPARTMENT OF BEHAVIORAL SCIENCES  
CHICAGO, ILLINOIS 60637

S. P. GROSSMAN (312) 753-4715

TESTS PERFORMED:

GENERAL EFFECTS: FOOD AND WATER INTAKE

COGNITIVE FUNCTIONS:

PERFORMANCE OF PREVIOUSLY LEARNED BEHAVIOR (SKINNER AND  
SHUTTLE BOXES)

CONDITIONED BEHAVIOR (LEVER PRESSING FOR FOOD; SHOCK  
AVOIDANCE)

MAZE LEARNING

HISTOLOGICAL EFFECTS: NEURON CELL LOSS

TEST SYSTEMS UTILIZED:

RATS: SUBCORTICAL AREAS

COMPOUNDS TESTED:

KANIC ACID; 6-HYDROXYDOPAMINE ARE INJECTED INTO SUBCORTICAL  
AREAS

REMARKS:

A. HALARIS, DEPARTMENT OF PSYCHIATRY, AND C. MUNOZ, DEPARTMENT  
OF BEHAVIORAL SCIENCES, ARE ALSO INVOLVED IN NEUROTOXICOLOGY  
TESTING AT THIS ORGANIZATION.

ORGANIZATION:

UNIVERSITY OF CINCINNATI COLLEGE OF MEDICINE  
KETTERING LABORATORY  
CINCINNATI, OHIO 45267

R. BORNSCHEIN (513) 872-5713

TESTS PERFORMED:

SENSORY TESTS:

NEGATIVE GEOTAXIS  
VISUAL DISCRIMINATION

MOTOR TESTS:

SPONTANEOUS MOTOR ACTIVITY (RUNNING WHEEL, JIGGLE CAGE,  
PHOTOCELL ACTIVITY CAGE, OPEN FIELD, REFLEXES)

GAIT

CIRCADIAN ACTIVITY

TREMOR

ROTAROD

COGNITIVE FUNCTIONS:

AVOIDANCE (ACTIVE AND PASSIVE)

SCHEDULE-CONTROLLED BEHAVIOR

DISCRIMINATION (T-MAZE)

NEUROPHYSIOLOGICAL: EEG

METABOLIC TESTS

TEST SYSTEMS UTILIZED:

MICE, RATS

COMPOUNDS TESTED:

LEAD, CADMIUM, HYDROCARBON SOLVENTS, AUTOMOBILE EXHAUST,  
ACRYLAMIDE, ETHYLNITROSOUREA, DRUGS

REMARKS:

L. HASTINGS, L. RAFFLES, H. ZENICK, S. LASLEY, A. MICHAELSON,  
AND G. COOPER ARE ALSO INVOLVED IN NEUROTOXICOLOGY TESTING AT  
THIS ORGANIZATION.

ORGANIZATION:

UNIVERSITY OF CINCINNATI MEDICAL CENTER  
DEPARTMENT OF ENVIRONMENTAL HEALTH  
CINCINNATI, OHIO 45267

L. HASTINGS (513) 872-5711

TESTS PERFORMED:

SENSORY TESTS:

VISUAL DISCRIMINATION

PAIN (TAIL FLICK)

MOTOR TESTS: SPONTANEOUS MOTOR ACTIVITY (RUNNING WHEEL,  
PHOTOCELL ACTIVITY CAGE, JIGGLE PLATFORM)

AROUSAL DEFICIT: STARTLE RESPONSE

COGNITIVE FUNCTIONS: OPERANT CONDITIONING

PHYSIOLOGICAL TESTS: AUTOMATIC SIGNS (HEART RATE)

TEST SYSTEMS UTILIZED:

RATS, MICE

COMPOUNDS TESTED:

HEAVY METALS - LEAD, CADMIUM

SOLVENTS - METHYL CHLOROFORM, METHYL CHLORIDE

REMARKS:

H. ZENICK IS ALSO INVOLVED IN NEUROTOXICOLOGY TESTING AT THIS  
ORGANIZATION.



ORGANIZATION:

UNIVERSITY OF KANSAS MEDICAL CENTER  
MENTAL RETARDATION RESEARCH CENTER  
KANSAS CITY, KANSAS 66103

S. NORTON

TESTS PERFORMED:

MOTOR TESTS:

SPONTANEOUS MOTOR ACTIVITY (RIGHTING REFLEX, PHOTOCCELL  
ACTIVITY CAGE, OPEN FIELD, WALKING)

GRIP STRENGTH

AROUSAL DEFICITS: AUDITORY STARTLE

COGNITIVE FUNCTIONS: RESIDENTIAL MAZE

DRUG CHALLENGE

TEST SYSTEMS UTILIZED:

RATS, CHICKENS

COMPOUNDS TESTED

HYPOTHYROID COMPOUNDS, IONIZING RADIATION, CARBON MONOXIDE

REMARKS:

THE COMPUTERIZED PATTERN RECOGNITION TEST IS USED WITH  
AMPHETAMINE-EXPOSED RATS INVOLVING THE USE OF PHOTOGRAPHIC  
METHODS TO DETERMINE BEHAVIORAL SEQUENCES.

ORGANIZATION:

UNIVERSITY OF MICHIGAN MEDICAL CENTER  
PATHOLOGY DEPARTMENT  
ANN ARBOR, MICHIGAN 48109

S. P. HICKS (313) 764-8170

TESTS PERFORMED:

MOTOR DEVELOPMENT (GAIT ANALYSIS)

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

RADIATION

REMARKS:

C. D'AMATO IS ALSO INVOLVED IN NEUROTOXICOLOGY TESTING AT THIS ORGANIZATION.

ORGANIZATION:

UNIVERSITY OF MICHIGAN MEDICAL SCHOOL  
ANN ARBOR, MICHIGAN 48109

W. STEBBINS (313) 764-8532

TESTS PERFORMED:

SENSORY TESTS: AUDITORY RESPONSE UNDER OPERANT CONDITIONS

MOTOR TESTS: REACTION TIME TO STIMULUS

MORPHOLOGICAL TESTS: INNER EAR AND COCHLEAR (RECEPTOR CELLS)  
FUNCTION

TEST SYSTEMS UTILIZED:

MONKEYS, CHINCHILLAS, GUINEA PIGS, CATS

COMPOUNDS TESTED:

NOISE, AMINOGLYCOCIDE ANTIBIOTICS, DIURETICS, SALICYLATES.  
QUININE

REMARKS:

D. MOODY, L. DAVIDSON, AND C. PROSEN ARE ALSO INVOLVED IN  
NEUROTOXICOLOGY TESTING AT THIS ORGANIZATION.

ORGANIZATION:

UNIVERSITY OF MINNESOTA  
DEPARTMENT OF PHARMACOLOGY  
MINNEAPOLIS, MINNESOTA 55455

S. SPARBER (612) 373-0314

TESTS PERFORMED:

MOTOR TESTS: SPONTANEOUS MOTOR ACTIVITY (OPEN FIELD)  
COGNITIVE FUNCTIONS:  
    OPERANT CONDITIONING  
    LEARNING  
    CONDITIONED BEHAVIOR (POSITIVE REINFORCEMENT)  
BIOCHEMICAL TESTS

TEST SYSTEMS UTILIZED:

RATS, MICE, CHICKENS

COMPOUNDS TESTED:

AMPHETAMINES, OPIATES, METHYL MERCURY

REMARKS:

THIS ORGANIZATION IS SEARCHING FOR APPROPRIATE TESTING METHODS  
TO TEST ENVIRONMENTAL EXPOSURE LEVELS FOR THE PURPOSE OF DEFIN-  
ING THRESHOLD LEVELS.

ANY FURTHER WORK IN THIS FIELD SHOULD INCLUDE A DISCUSSION WITH  
DR. SPARBER.

ORGANIZATION:

UNIVERSITY OF MISSISSIPPI  
DEPARTMENT OF PHARMACOLOGY  
UNIVERSITY, MISSISSIPPI 38677

M. DAVIS (601) 232-7330

TESTS PERFORMED:

COGNITIVE FUNCTIONS: CONDITIONED AVOIDANCE (SHUTTLE BOX)  
RESPONSE  
SENSORY TESTS: PAIN (TAIL FLICK)  
PHYSIOLOGICAL TESTS  
MOTOR TESTS:  
TREADMILL ROTAROD  
SPONTANEOUS MOTOR ACTIVITY (PHOTOCCELL, OPEN FIELD)

TEST SYSTEMS UTILIZED:

RATS, DOGS, MONKEYS

COMPOUNDS TESTED:

ABUSE DRUGS - CANNABIS, COCAINE METABOLITES, HALLUCINOGENS

REMARKS:

J. BEDFORD AND M. WILSON ARE WORKING WITH ALCOHOL AND OPERANT  
BEHAVIOR.

ORGANIZATION:

UNIVERSITY OF NORTH CAROLINA  
SCHOOL OF MEDICINE  
BIOLOGICAL SCIENCES RESEARCH CENTER  
DEPARTMENT OF PSYCHIATRY'S PHARMACOLOGY  
CHAPEL HILL, NORTH CAROLINA 27514

DR. RICHARD MAILMAN (919) 966-3081

TESTS PERFORMED:

MOTOR TESTS:

SPONTANEOUS MOTOR ACTIVITY (JIGGLE CAGE)  
DRUG-INDUCED SPONTANEOUS MOTOR ACTIVITY  
STEREOTYPED BEHAVIOR  
DRUG-INDUCED STEREOTYPED BEHAVIOR  
ROTAROD  
RIGHTING REFLEX

PHYSIOLOGICAL TESTS:

RESPIRATION  
ECG

BODY WEIGHT  
CONSUMPTION

COGNITIVE TESTS:

OPERANT CONDITIONING

TEST SYSTEMS UTILIZED:

RATS, MICE

COMPOUNDS TESTED:

PRO AND ANTIDOPAMINERGIC DRUGS  
ENVIRONMENTAL POLLUTANTS (METALS, PCBs<sup>\*</sup>)

REMARKS:

DR. GEORGE BREESE IS ALSO INVOLVED WITH NEUROTOXICOLOGY TESTING  
AT THIS ORGANIZATION.

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<sup>\*</sup> POLYCHLORINATED BIPHENYLS

ORGANIZATION:

UNIVERSITY OF NORTH CAROLINA  
BIOSCIENCES RESEARCH CENTER  
CHAPEL HILL, NORTH CAROLINA 27514

D. MILLER (919) 966-3081

TESTS PERFORMED:

COGNITIVE FUNCTIONS:

PASSIVE AVOIDANCE TEST (LICK SUPPRESSION)

OPERANT CONDITIONING (2-LEVER ALTERATION)

PHYSIOLOGICAL TESTS

MOTOR TESTS: SPONTANEOUS MOTOR ACTIVITY (PHOTOCELL CAGE)

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

ORGANOTIN (TRIETHYL-, TRIMETHYL-)

REMARKS:

L. D. GRANT IS ALSO INVOLVED IN NEUROTOXICOLOGY TESTING AT THIS ORGANIZATION.

ORGANIZATION:

UNIVERSITY OF NORTH CAROLINA  
CHAPEL HILL, NORTH CAROLINA 27514

M. KRIGMAN (919) 966-4584

TESTS PERFORMED:

BIOCHEMICAL TESTS: MYELIN AND AXONAL TRANSPORT  
NEUROPHARMACOLOGICAL TESTS: PUTATIVE TRANSMITTERS  
MORPHOLOGICAL TESTS: LIGHT AND ELECTRON MICROSCOPY

TEST SYSTEMS UTILIZED:

RATS, PIGEONS

COMPOUNDS TESTED:

INORGANIC LEAD; TRIMETHYL AND TRIETHYL TIN; CADMIUM; TRIPROPYL  
TIN, TRIBUTYL TIN; TRICYCLOHEXYL TIN and TRIPHENYL TIN;  
TRIMETHYL AND TRIETHYL LEAD; TRIMETHYL GERMANIUM



ORGANIZATION:

UNIVERSITY OF ROCHESTER  
DEPARTMENT OF PSYCHOLOGY  
ROCHESTER, NEW YORK 14642

J. ISON (716) 275-2453

TESTS PERFORMED:

REFLEX MODIFICATION: JUMPING BEHAVIOR PRECEDED BY "STARTLE-  
FLINCH"

TEST SYSTEMS UTILIZED:

RATS, MICE

COMPOUNDS TESTED:

CADMIUM; MISONIDOZOLE; DIAZEPAM; METHYL MERCURY

REMARKS:

P. CONROY, CANCER CENTER; C. KELLOG, DEPARTMENT OF PSYCHIATRY;  
B. WEISS, RADIATION BIOLOGY AND BIOPHYSICS; AND V. LATIES,  
RADIATION BIOLOGY AND BIOPHYSICS, ARE ALSO INVOLVED IN NEURO-  
TOXICOLOGY TESTING AT THIS ORGANIZATION.

ORGANIZATION:

UNIVERSITY OF SOUTHERN CALIFORNIA  
BIOLOGICAL SCIENCES SECTION  
SCHOOL OF PHARMACY  
LOS ANGELES, CALIFORNIA 90033

J. SCHIH (213) 226-2565

TESTS PERFORMED:

BIOCHEMICAL TESTS:  
HORMONAL SECRETION  
RECEPTOR BINDING

TEST SYSTEMS UTILIZED:

RATS, MICE

COMPOUNDS TESTED:

ANTIDEPRESSANTS; SEROTONIN-UPTAKE BLOCKERS; RECEPTOR AGONIST AND  
ANTAGONISTS

REMARKS:

S. CHENG AND H. YOUNG ARE ALSO INVOLVED IN NEUROTOXICOLOGY  
TESTING AT THIS ORGANIZATION.

ORGANIZATION:

UNIVERSITY OF WASHINGTON  
DEPARTMENT OF PSYCHOLOGY  
SEATTLE, WASHINGTON

B. BURBACHER (206) 543-9300

TESTS PERFORMED:

DEVELOPMENTAL BEHAVIOR:

BASIC REFLEXES

HEART RATE

TEMPERATURE

SUCKING RESPONSE IMMEDIATELY AFTER BIRTH

SKELETAL AND VISUAL DEVELOPMENT

TEST SYSTEMS UTILIZED:

RATS, MICE, MONKEYS

COMPOUNDS TESTED:

METHYL MERCURY, CADMIUM, ARSENIC AND OTHER HEAVY METALS

REMARKS:

K. MOTTET, DEPARTMENT OF PATHOLOGY; W. CHEN, DEPARTMENT OF  
PATHOLOGY; AND DR. SHAW, DEPARTMENT OF PATHOLOGY, ARE ALSO  
INVOLVED IN NEUROTOXICOLOGY TESTING AT THIS ORGANIZATION.

ORGANIZATION:

UNIVERSITY OF WISCONSIN, MADISON  
DEPARTMENT OF PSYCHOLOGY  
PRIMATE LABORATORY  
MADISON, WISCONSIN 53706

R. E. BOWMAN (608) 263-3550

TESTS PERFORMED:

MOTOR TESTS: SPONTANEOUS MOTOR ACTIVITY (ACTIVITY BOX)  
COGNITIVE FUNCTIONS:  
DISCRIMINATION (MAZE)  
OPERANT CONDITIONING

TEST SYSTEMS UTILIZED:

MONKEYS, RATS

COMPOUNDS TESTED:

PCB<sup>\*</sup>, PBB<sup>\*\*</sup>, DIOXIN, HALOTHANE

REMARKS:

J. ALLEN AND R. GOY ARE ALSO INVOLVED IN NEUROTOXICOLOGY TESTING  
AT THIS ORGANIZATION.

<sup>\*</sup> POLYCHLORINATED BIPHENYLS  
<sup>\*</sup> POLYBROMINATED BIPHENYLS

ORGANIZATION:

U.S. ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE  
BEHAVIORAL SCIENCES DEPARTMENT  
EXPERIMENTAL PSYCHOLOGY DIVISION  
BETHESDA, MARYLAND 20014

R. YOUNG (703) 295-0114

TESTS PERFORMED:

SENSORY TESTS: VISUAL DISCRIMINATION  
MOTOR TESTS: SPONTANEOUS MOTOR ACTIVITY (OPEN FIELD)  
COGNITIVE FUNCTIONS:  
    OPERANT CONDITIONING  
    DISCRIMINATED AVOIDANCE  
    SIDMAN AVOIDANCE  
CONSUMMATORY AND PHYSIOLOGICAL TESTS  
NEUROLOGICAL TESTS:  
    EEG  
    NERVE CONDUCTION VELOCITY

TEST SYSTEMS UTILIZED:

RODENTS, MONKEYS, MINIATURE PIGS

COMPOUNDS TESTED:

IONIZING RADIATION, NITRATE ESTERS, #5 FUELS, ACRYLAMIDE, LEAD,  
METHYL MERCURY, ETHANOL

REMARKS:

V. BOGO IS ALSO INVOLVED IN NEUROTOXICOLOGY TESTING AT THIS  
INSTITUTION.

ORGANIZATION:

U.S. ENVIRONMENTAL PROTECTION AGENCY  
NEUROTOXICOLOGY DIVISION  
MD-74B  
RESEARCH TRIANGLE PARK, NORTH CAROLINA 27711

L. REITER (919) 541-2671

TESTS PERFORMED:

MOTOR TESTS:

SPONTANEOUS LOCOMOTOR ACTIVITY (FIGURE-8-MAZE, OPEN FIELD)

NEUROMOTOR FUNCTION (FOOT SPREAD TECHNIQUE, GAIT)

AROUSAL DEFICIT: STARTLE RESPONSE (FORCE PLATFORM)

COGNITIVE FUNCTIONS:

PASSIVE AVOIDANCE (STEP-THROUGH)

DEVELOPMENTAL NEUROTOXICITY TESTING

TEST SYSTEMS UTILIZED:

RATS, MICE

COMPOUNDS TESTED:

HEAVY METALS, ALKYL TINS, PESTICIDES, TOXIC SUBSTANCES

REMARKS:

P. RUPPERT IS A MEMBER OF THIS ORGANIZATION.

ORGANIZATION:

U.S. ENVIRONMENTAL PROTECTION AGENCY  
NEUROTOXICOLOGY LABORATORY  
RESEARCH TRIANGLE PARK, NORTH CAROLINA 27711

R. PETTINELLI (919) 541-2450

TESTS PERFORMED:

COGNITIVE FUNCTIONS:  
DISCRIMINATION (T-MAZE)  
OPERANT CONDITIONING

TEST SYSTEMS UTILIZED:

RATS, MONKEYS

COMPOUNDS TESTED:

PESTICIDES

REMARKS:

M. GAGE AND R. G. McPHAIL ARE ALSO INVOLVED IN NEUROTOXICOLOGY  
TESTING AT THIS ORGANIZATION.

ORGANIZATION:

U.S. ENVIRONMENTAL PROTECTION AGENCY  
TOXIC EFFECTS BRANCH  
HEALTH REVIEW DIVISION  
OFFICE OF TESTING AND EVALUATION  
OFFICE OF PESTICIDES AND TOXIC SUBSTANCES

W. SETTE (TS-792) (703) 755-4863

REMARKS:

T. LEVINE AND J. MURPHY ARE INVOLVED IN PROPOSING RULES AND  
REGULATIONS REGARDING BEHAVIORAL TERATOLOGY AND BEHAVIORAL  
TOXICOLOGY.



ORGANIZATION:

U.S. FOOD AND DRUG ADMINISTRATION  
BUREAU OF FOODS  
DIVISION OF TOXICOLOGY  
HFF-162  
WASHINGTON, D.C. 20204

T. SOBOTKA (202) 245-1304

TESTS PERFORMED:

SENSORY TESTS:

PAIN  
NEGATIVE GEOTAXIS

MOTOR TESTS:

SPONTANEOUS MOTOR ACTIVITY (OPEN FIELD, INCLINED SCREEN)  
ROTAROD  
CIRCADIAN ACTIVITY

AROUSAL DEFICITS: STARTLE RESPONSE

COGNITIVE FUNCTIONS:

SCHEDULE-CONTROLLED BEHAVIOR  
ESCAPE  
AVOIDANCE (ACTIVE AND PASSIVE)  
DISCRIMINATION (MAZE)  
RETENTION

PHYSIOLOGICAL TESTS: AUTONOMIC SIGNS

TEST SYSTEMS UTILIZED:

RATS, DOGS, PIGS

COMPOUNDS TESTED:

GRAS COMPOUNDS  
FOOD ADDITIVES  
CNS STIMULANTS:  
AMPHETAMINE  
CAFFEINE  
MYCOTOXINS  
ACRYLAMIDE  
HEAVY METALS (LEAD, CADMIUM, METHYL MERCURY)

ORGANIZATION:

WARNER-LAMBERT/PARKE-DAVIS  
ANN ARBOR, MICHIGAN 48106

J. SCHARDEIN (313) 994-3500, ext. 339

TESTS PERFORMED:

SENSORY TESTS:

PAIN (TAIL FLINCH)  
VISUAL PLACING

MOTOR TESTS:

SPONTANEOUS MOTOR ACTIVITY (OPEN FIELD)  
GRIP STRENGTH (TRACTION TEST)

AROUSAL DEFICITS: STARTLE REFLEX (AUDITORY)  
COGNITIVE FUNCTIONS: CONDITIONED AVOIDANCE  
PHYSIOLOGICAL TESTS

TEST SYSTEMS UTILIZED:

RATS

COMPOUNDS TESTED:

DEVELOPMENTAL COMPOUNDS

REMARKS:

J. PETRERE IS ALSO INVOLVED IN NEUROTOXICOLOGY TESTING AT THIS ORGANIZATION.

ORGANIZATION:

WASHINGTON STATE UNIVERSITY  
DEPARTMENT OF PSYCHOLOGY  
PULMAN, WASHINGTON 99164

R. H. ETTINGER (509) 335-2631

REMARKS:

H. ETTINGER IS DEVELOPING MORE SENSITIVE SCREENING PROCEDURES,  
ESPECIALLY OPERANT CONDITIONING, USING MULTIPLE AND CONCURRENT  
REINFORCEMENT SCHEDULES.

ORGANIZATION:

WASHINGTON UNIVERSITY  
SCHOOL OF MEDICINE  
DEPARTMENT OF PHARMACOLOGY  
ST. LOUIS, MISSOURI

J. FERRENDELLI (314) 454-2309

TESTS PERFORMED:

BEHAVIORAL TESTS: MOTOR AND SENSORY FUNCTIONS BY OBSERVATION  
NEUROLOGICAL:

EEG

SINGLE-CELL ACTIVITY

BIOCHEMICAL TESTS:

NEUROTRANSMITTER'S RELATIONSHIP WITH DRUGS

CEREBRAL RESPIRATION

ENERGY AND CARBOHYDRATE METABOLISM

TEST SYSTEMS UTILIZED:

MICE, RATS, GUINEA PIGS

COMPOUNDS TESTED:

THERAPEUTIC DRUGS; e.g., ANTICONVULSIVE AND CONVULSIVE DRUGS

REMARKS:

T. CICERO, AT THE DEPARTMENT OF PSYCHIATRY, IS TESTING NARCOTIC AGENTS.

**APPENDIX A**  
**INDEX OF INDIVIDUALS IN THE DIRECTORY**

APPENDIX A  
INDEX OF INDIVIDUALS IN THE DIRECTORY

<u>NAME</u>	<u>ORGANIZATION</u>
Abel, E. L.	Research Institute of Alcoholism
Abou-Donia, M. B.	Duke University Medical Center
Allen, T.	University of Wisconsin
Andrew, F. D.	Battelle-Pacific Northwest Laboratory
Anger, K.	National Institute for Occupational Safety and Health
Annau, Z.	Johns Hopkins University
Aphouse, L.	National Institute of Environmental Health Sciences
Avery, D. L.	University of Arkansas Medical Center
Baetke, K.	Jefferson Professional Services
Bagdon, R.	Sandoz, Inc.
Baker, T.	Cornell Medical School
Balstar, R.	Medical College of Virginia
Barone, F.	Brain Research Laboratory
Barthalmus, G. T.	North Carolina State University
Bedford, J.	University of Mississippi
Bogo, V.	U.S. Armed Forces Radiobiology Research Institute
Bondie, S.	National Institute of Environmental Health Sciences
Bornschein, R.	University of Cincinnati College of Medicine
Bowman, R. E.	University of Wisconsin
Bradford, J. C.	Sterling-Winthrop Research Institute
Bradshaw, S.	Brigham Young University
Breese, G.	University of North Carolina

<u>NAME</u>	<u>ORGANIZATION</u>
Burbacher, B.	University of Washington
Butcher, R.	Children's Hospital Research Foundation
Cabe, P.	National Institute of Environmental Health Sciences
Chambers, J.	Mississippi State University
Cann, F.	Lederle Laboratories
Chen, W	University of Washington
Cheng, S.	University of Southern California
Cho, E. S.	New Jersey Medical School
Chrislip, D.	National Institute for Occupational Safety and Health
Cicero, T.	Washington University
Conroy, P.	University of Rochester Cancer Center
Cooper, G.	University of Cincinnati College of Medicine
Couri, D.	Ohio State University
Cranmer, M.	Jefferson Professional Services
Crow, D.	Albert Einstein College of Medicine
Cunningham, W.	Iowa State University
D'Amato, C.	University of Michigan Medical Center
Davidson, L.	University of Michigan Medical School
Davis, M.	University of Mississippi
Dews, P. B.	Harvard University
DiVincenzo, G. D.	Eastman Kodak Company
Eagen, J.	Exxon Corporation
Ettlinger, R. H.	Washington State University



NAMEORGANIZATION

Evans, H. L.	New York University Medical Center
Fechter, L.	Johns Hopkins University
Ferrendelli, J.	Washington University
Friedler, G.	Boston University
Frith, C.	Jefferson Professional Services
Gage, M.	U.S. Environmental Protection Agency, Research Triangle Park
Gaines, T.	Jefferson Professional Services
Gardocki, J.	McNeil Laboratories, Inc.
Geller, I.	Southwest Foundation for Research and Education
Golub, M.	University of California, Davis
Goy, R.	University of Wisconsin
Grant, L.D.	University of North Carolina
Griffin, J.	Johns Hopkins Hospital
Grossman, S. P.	University of Chicago
Haddad, R. K.	New York State Institute for Research in Mental Retardation
Balaris, A.	University of Chicago
Harris, S.	Science Applications, Inc.
Hastings, L.	University of Cincinnati College of Medicine
Beise, G. A.	Indiana University
Helee, M.	New York State Institute for Research in Mental Retardation
Hicks, S. P.	University of Michigan Medical Center
Highman, B.	Jefferson Professional Services

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MITRE CORP MCLEAN VA METREK DIV

F/G 6/20

EVALUATION OF SHORT-TERM BIOASSAYS TO PREDICT FUNCTIONAL IMPAIR--ETC(U)

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**APPENDIX B**  
**INDIVIDUALS UNAVAILABLE FOR COMMENT**  
**BUT LIKELY TO BE ACTIVE IN**  
**NEUROBEHAVIORAL TESTING**



APPENDIX B  
INDIVIDUALS UNAVAILABLE FOR COMMENT  
BUT LIKELY TO BE ACTIVE IN  
NEUROBEHAVIORAL TESTING

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